REMARKS/ARGUMENTS

Claims 17-29 remain under examination. Claims 1-9 have been canceled. Claims 10-16 have been withdrawn from consideration.

The requirement for restriction was traversed by applicant but was reaffirmed by the Examiner. It is respectfully requested that these claims be held in abeyance until this case is ready for issue or applicants file a Divisional Application which include these claims.

Claims 1-9 have been canceled and replaced with new claims 21-29.

Claims 1-9 and 17-20 were rejected under 35 USC103(a) as being unpatentable over Benham et al (716). As this rejection may be applied to the remaining claims 17-29, it is respectfully traversed for the following reasons.

Before discussing the reference in detail and how it fails to anticipate or make obvious claims 17-29, a brief review of the present invention will be beneficial. The present invention involves modifying or "retrofitting" an existing "natural gas-to-methanol" plant to one which can convert natural gas to liquid hydrocarbon products (e.g. diesel). The present specification clearly set forth the advantages of such a modification. Basically, the present invention allows relatively small or otherwise market-inaccessible natural gas reserves to be commercially developed. This is extremely important in undeveloped areas of the world, especially in view of the present shortage in natural gas supplies.

More specifically, the present invention saves most presently-existing, idled methanol plants from the "scrap-heap" and reclaims most of the very expensive equipment for a very useful purpose. That is, the very expensive components of these recently idled methanol plants are used to convert natural gas at remote locations into needed liquid hydrocarbons (e.g. diesel fuel). Without the conversions of these plants, the economics would be such that development of these small and/or remote gas supplies would not be commercially feasible. In the real world, engineering studies have shown that "re-utilized" equipment from a typical existing natural gas-to-methanol plant, including transportation and refurbishing, will be approximately 75% less than the same equipment if purchased new. In an actual example, applicants' assignee recently purchased an idled methanol facility, with a new-worth value of US$110 million for only US$5 million (less than 5% of the original costs). As can readily be seen, this can easily make a gas-to-liquid project commercial where otherwise it would be of little or no interest.

Turning now to the claims and the applied art, original claims 17-20 and new claims 21-29 all recite a method for modifying a "natural gas-to-methanol" system (plant) to one which will convert natural gas to liquid hydrocarbon products. When producing syngas from the syngas synthesis subsystem (SSS) of a methanol plant, it is desirable that it is high in CO_2 and H_2 in order for the following reactions to occur:

$CO + 2H_2 \rightarrow CH_3OH$ (methanol) and $CO_2 + 3H_2 \rightarrow CH_3OH + H_2O$

While the production of CO_2 is desirable in the Fischer-Trosch (F-T) process for producing methanol, it is not only harmful to the F-T process for producing liquid hydrocarbon but may actually be harmful to the catalysts which are use in the liquid hydrocarbon process. That is:

$nCO + (2n + 1)H_2 \rightarrow H\text{-}(CH_2)_n\text{-}H$ (hydrocarbons) $+nH_2O$ and $CO_2 + H_2$ (nothing)

As seen from above, the CO_2 and H_2 do not react. Instead, the CO_2 occupies unnecessary sites on the surface of the catalyst and therefore can significantly limit the conversion of the syngas to the desired liquid hydrocarbons and thereby adversely affect the efficiency of the conversion; see *Font Freide et al, "An Adventure in Catalysts", TOPICS IN CATALYSTS, Dec. 2003, Vol. 26, no. 1-4, pp. 173-174..*

Benham et al discloses a process for the substantial direct conversion of natural gas to liquid hydrocarbons by a F-T process. That is, Benham et al have the luxury of being able to start from scratch and buy and design new equipment to fit the parameters of their process. Benham et al is not restricted by any particular composition of the syngas produced in their SSS but obviously designs their SSS to produce a syngas having the desired CO, CO_2 and H_2 composition for conversion to **liquid hydrocarbons** in a F-T reactor without any significant further "adjusting" being required. In the present invention, the original SSS of the previously existing methanol plant has already been designed to produce a syngas which is to be converted to **methanol** in a F-T reactor, not one which is be used for conversion to **liquid hydrocarbons**. As explained above, the syngas from the original SSS of the methanol system is not readily useable in the original product synthesis subsystem (PSS) of the methanol plant so its composition has to be adjusted" before it enters the F-T reactor (different catalyst) of the original PSS.

To briefly summarize the above, in order to commercially use the expensive equipment from an idled methanol plant, applicants have provided a syngas adjusting subsystem (SAS) for adjusting ratio of CO_2 to H_2 in the syngas produced from the original SSS of a methanol plant before the syngas is conveyed to the F-T reactor in the original PSS of the methanol plant.

Since the original SSS of Benham et al is designed to produce a syngas having a desired composition for F-T conversion to liquid hydrocarbons, there is no need for Benham et al to even consider the addition of the SAS, as recited in the present claims, to their process. Further, since Benham et al nor any other known art teachs or even suggests how a typical, existing methanol plant can be modified to produce liquid hydrocarbons, it is respectfully submitted that claims 17-29 are all patentable over Benham et al under 35 USC 102 and /or 35 USC 103.

Applicants have canceled 9 original claims and added 9 new claims and accordingly, there should be no additional fees due. However, if applicants are incorrect, the undersign hereby authorizes any such fees to be changed to his Deposit Account No. 060255

Since all of the remaining claims in this case are sincerely believed to be allowable for the reasons set forth above, it is respectfully requested that this case be reexamined and passed to issue.

Respectfully submitted,

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